WHAT IS CLAIMED IS:

1. In a non-contact tonometer having a fluid pump communicating with a fluid discharge tube to generate and deliver a fluid pulse for deforming a cornea, wherein said fluid pump comprises a cylinder and piston displaceable relative to said cylinder for compressing fluid within a plenum chamber defined by said piston and said cylinder, the improvement comprising:

said piston and said cylinder being configured such that said plenum chamber transitions from being in exclusive communication with said fluid discharge tube to being in non-exclusive communication with said fluid discharge tube as said piston moves beyond a predetermined displacement position relative to said cylinder.

2. The improvement according to claim 1, wherein said plenum chamber is in communication with atmosphere when said piston is beyond said predetermined displacement position.

3. In a non-contact tonometer having a fluid pump communicating with a fluid discharge tube to generate and deliver a fluid pulse for deforming a cornea, wherein said fluid pump comprises a cylinder and piston displaceable relative to said cylinder for compressing fluid within a plenum chamber defined by said piston and said cylinder, the improvement comprising:

said cylinder having an inner tubular part and an outer tubular part for receiving said inner tubular part, wherein a volume of fluid delivered in said fluid pulse is metered by axially adjusting said inner and outer tubular parts relative to one another prior to generating said fluid pulse.

4. The improvement according to claim 3, further comprising a metering adjustment drive connected to said inner tubular part for axially moving said inner tubular part relative to said outer tubular part.

5. A fluid pump system for a non-contact tonometer, said fluid pump system comprising:

a fluid discharge tube;

a cylinder having a primary port and an exhaust port; and

a piston displaceable along an axis relative to said cylinder from an initial reference position, said piston and said cylinder defining a plenum chamber in communication with said fluid discharge tube through said primary port;

wherein said exhaust port is sealed until said piston has forced a predetermined volume of fluid from said plenum chamber through said primary port, and thereafter said exhaust port becomes unsealed such that said plenum chamber develops a leak through said exhaust port.

6. The fluid pump system according to claim 5, wherein said cylinder comprises telescopically arranged inner and outer tubular parts, and said predetermined volume of fluid is metered by axially adjusting said inner and outer parts relative to one another.

7. The fluid pump system according to claim 6, further comprising an automatic drive mechanism arranged to axially adjust said inner and outer parts relative to one another.

8. The fluid pump system according to claim 7, wherein said automatic drive mechanism is operatively connected to said inner part.

9. The fluid pump system according to claim 5, wherein said piston includes a plunger having a leading edge and a trailing edge, and said cylinder comprises a tubular body open at a proximal end thereof, said tubular body being sized to guide said plunger in an axial direction of said tubular body and having at least one internal flow channel extending in said axial direction from a first location spaced from said proximal end of said tubular body to a second location spaced further from said proximal end of said tubular body, the axial distance between said first location and said second location being greater than the axial distance between said leading edge and said trailing edge of said plunger;

whereby said open proximal end of said tubular body acts as said exhaust port when said trailing edge of said plunger moves beyond said first location.

10. The fluid pump system according to claim 6, wherein said piston includes a plunger having a leading edge and a trailing edge, and said inner part of said cylinder is open at a proximal end thereof and sized to guide said plunger in an axial direction of thereof, said inner part having at least one internal flow channel extending in said axial direction from a first location spaced from said proximal end of said inner part to a second location spaced further from said proximal end of said inner part, the axial distance between said first location and said second location being greater than the axial distance between said leading edge and said trailing edge of said plunger;

whereby said open proximal end of said inner part acts as said exhaust port when said trailing edge of said plunger moves beyond said first location.

11. The fluid pump system according to claim 10, wherein said inner part includes said open proximal end, said outer part includes said primary port, and said at least one flow channel is defined by a slot in said inner part.

12. The fluid pump system according to claim 5, wherein said exhaust port extends in a radial direction through said cylinder, and said piston includes a hollow plunger open at its front end and elongated in said axial direction to seal said exhaust port, said plunger having an escape passage extending in a radial direction therethrough, whereby said exhaust port becomes unsealed when said escape passage of said plunger overlaps with said exhaust port.

13. The fluid pump system according to claim 12, wherein said exhaust port is a circumferential arcuate slot in said cylinder and said predetermined volume of fluid is metered by adjusting said initial reference position.

14. The fluid pump system according to claim 12, wherein said escape passage is a circumferential arcuate slot in said plunger and said predetermined volume of fluid is metered by adjusting said initial reference position.

15. The fluid pump system according to claim 12, wherein said exhaust port is a circumferential arcuate slot in said cylinder, said escape passage is a circumferential arcuate slot in said plunger, and said predetermined volume of fluid is metered by adjusting said initial reference position.

16. The fluid pump system according to claim 12, wherein said exhaust port is a helical slot in said cylinder and said predetermined volume of fluid is metered by adjusting the angular orientation of said piston relative to said cylinder about said axis of displacement.

17. The fluid pump system according to claim 12, wherein said escape passage is a helical slot in said plunger and said predetermined volume of fluid is metered by adjusting the angular orientation of said piston relative to said cylinder about said axis of displacement.

18. The fluid pump system according to claim 12, wherein said exhaust port is a helical slot in said cylinder, said escape passage is a helical slot in said plunger, and said predetermined volume of fluid is metered by adjusting the angular orientation of said piston relative to said cylinder about said axis of displacement.

19. In a method of measuring intraocular pressure of an eye by taking sequential measurements using a non-contact tonometer having a fluid pump for generating a fluid pulse to deform the cornea of said eye, the improvement comprising the step of:

metering a volume of fluid used to generate said fluid pulse based on a prior measurement result.

20. The improvement according to claim 19, wherein said volume of fluid is metered by causing a leak to develop in said fluid pump at a chosen point during generation of said fluid pulse.